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The History of the Treatment of
Spondylitis and Scoliosis by
Partial Suspension and
Retention by means
of Plaster-of-Paris
Bandages.

BY

LEWIS A. SAYRE, M. D.

[also] The Plaster of Paris, Wood, Alu-
minum, and other Spinal
Supports.

BY

A. M. PHELPS, M. D.

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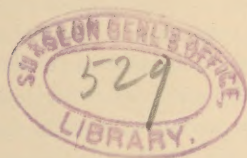
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Lewis A. Sayre





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THE HISTORY OF THE
TREATMENT OF SPONDYLITIS AND SCOLIOSIS
BY PARTIAL SUSPENSION AND
RETENTION BY MEANS OF PLASTER-OF-PARIS BANDAGES,

*Together with the Present Status of this Plan of Treatment
before the Profession of the World.**

BY LEWIS A. SAYRE, M. D.

WHEN any new mode of treatment is advanced in medicine or surgery, its advocates are apt to be overenthusiastic, and many of their readers, misled by apparent brilliancy of immediate results, often fall into extravagant praise, which further investigation leads them to modify ; and, at times, discoveries which have been heralded as striking boons to humanity have afterward been so completely forgotten that subsequent investigators have supposed them original when they rediscovered them for a second time, as was so admirably shown in the historical sketch of spinal supports read before you last year by Dr. Phelps.

It is now twenty years since I first applied plaster-of-Paris jackets for the treatment of Pott's disease and lateral

* Read before the New York Academy of Medicine, January 31, 1895.

curvature of the spine, and when your president did me the honor to ask me to read a paper before you, it seemed to me that I could find no better way of occupying your time than by presenting for your consideration a *résumé* of the origin of the plan, and of the opinions of the medical profession of the world at large in regard to this mode of treatment after this lapse of time. That the treatment has not received universal acceptance is plain from a reading of the medical journals, though, in my opinion, the objections which have been advanced against it are, for the most part, due to a lack of comprehension on the part of the objectors of the principles which I have advocated, and their failure to properly carry out the mode of applying these principles; while, on the other hand, some of the more enthusiastic advocates of this method have gone to the other extreme, and claimed for it more than I have ever asked. As twenty years have now elapsed since I first practiced this method of treatment, it may not be without interest if I briefly review the manner in which I first came to adopt it.

For many years I was in the habit of treating most of my cases of Pott's disease with the "Taylor brace." I used to treat those who were too poor to pay for the instrument by applying what I called the "turtle shell" to the back.

This was made by laying the child on its belly across my lap, with the legs hanging over one side and the arms over the other, I then separating my legs so as to extend the spine and straighten it as much as possible, and until the child was perfectly easy and comfortable, which was made manifest in many cases by the *improved respiration* and the disappearance of grunting or jerking of the diaphragm.

While the child was held in this position a piece of

linen or cotton cloth was accurately cut and shaped to the entire back, and two thirds around the entire trunk. In cases where the disease was in the cervical region the cloth was cut to extend to the top of the back of the head. Two or more pieces of cloth cut after the same pattern were then dipped in a mixture of plaster of Paris and water and laid smoothly over the first one. In the cases where the disease was in the cervical vertebræ, several thicknesses of this plaster bandage were put on the back of the neck, to give firm support to the head. Another piece of the cloth cut on the same pattern was then placed over the whole, and, while the spine was well stretched by separating my legs, an assistant applied a smooth roller bandage around the entire body and head, fitting it nicely into all the irregularities, and especially over the crest of the ilium, thus giving perfect support and preventing any motion of the spine.

When the plaster had become set, the child was then laid in the "turtle shell" on his back on a pillow, and the mother could sew a neat-fitting front to the sides of the plaster shell, and, lacing it in the center from pubes to sternum, make it give firm support to the spine, while at the same time it could be removed for purposes of cleanliness.

In very many cases this simple plan of giving rest to the spinal column was attended with very satisfactory results, especially where the disease was in the cervical region, in which location, if the head and neck had been well extended while the plaster bandages were applied, and retained in this position till the plaster was set, the weight of the head was removed from the neck and supported by the shoulders by the closely fitting plaster cast, and at the same time the whole spine was absolutely immovable—that is, no movements could take place between the separate bones.

In November, 1874, a little boy was brought to me having a sharp posterior curvature of the last three dorsal and the first lumbar vertebræ, and there was also partial paralysis of the rectum and one leg. As it was impossible to send the child to the hospital, as he did not live in the city, and I had no time to apply the "turtle shell," I felt compelled to devise some plan by means of which the boy could be made comfortable while being transported to his home at Chatham Four Corners, Putnam County, New York, nearly one hundred and fifty miles distant. Having studied the subject for some time, and questioned myself regarding the propriety of completely incasing the trunk with a plaster dressing, I had finally resolved to make the experiment as soon as a suitable opportunity was offered. It seemed to me that the opportunity had then come, and that the circumstances justified the measure. Accordingly, I directed one of my assistants to suspend the boy by the arms in order to see what effect would be produced, and I noticed that, as soon as the boy was made pendent, there was more motion in the paralyzed limb than before, that the girdling pain around the belly was very much relieved, and that the patient was breathing much easier. While he was suspended in this manner, I pulled down his shirt and tied it between his legs, thus making it fit the body closely and smoothly, and then took some plaster-of-Paris bandages which had been prepared in the ordinary manner to be used in the treatment of diseased ankle joints, and, commencing at the pelvis between the trochanters and the crest of the ilium, completely encircled the entire trunk to the axilla. At first I was anxious concerning the effect that would be produced upon the respiration, but, inasmuch as the boy cried lustily, all my fears in that direction were quickly dispelled, and I went on, reversed the bandage, brought it back to the pelvis, and so went on until four or

five thicknesses of the roller were made to completely embrace the body. He was kept suspended by the hands of my assistant for about twenty minutes, until the plaster of Paris became hard. He was then laid upon his face on a sofa, and was to remain there until the plaster had become firmly set. I left him upon the sofa and went to my lunch, and when I returned, I found, to my complete astonishment, that the little fellow had got up and walked across the office, and was then looking out of the window. Still fearing that respiration might be interfered with too much, I cut through the dressing from the top of the sternum to the pubes, thus allowing it to gap considerably and permit of a more complete expansion of the chest. *The boy, however, did not feel as comfortable after as before the incision through the front part of the jacket was made.* I then applied a roller bandage around the pelvic portion of the jacket and again brought its edges together, but left the upper portion to separate as much as the movements of respiration seemed to require. In order to give security to the upper or thoracic portion, and at the same time to permit free expansion of the chest walls, I took the mother's elastic garter, cut it into six strips, fastened them upon each side of the slit in the jacket, and then tied them in front.

The dressing now being completed, I requested the parents to return with the child at the end of a week or ten days, when I would have a Taylor's brace ready and would adjust it. The plaster jacket had been put on simply for the purpose of rendering the child comfortable while being carried home. That was the last I saw of either the child or the parents until the following February, four months and a half, when he again returned.

In the meantime the boy had grown considerably, looked healthy, was able to walk without assistance, and was not obliged to support the upper portion of the trunk

by placing his hands upon his knees. Without waiting to make any further examination, I at once took the patient in my carriage and started for my clinic at Bellevue Hospital Medical College. The streets were covered with holes and elevations formed by the ice and snow, and the jolting was almost intolerable, yet the boy made no complaint whatever. That fact of itself showed how efficient the dressing was for securing absolute rest to the diseased parts. At the college the jacket was removed in the presence of the class, when it was found that the curvature was much less, but now the boy was unable even to sit up. As soon, however, as the dressing was reapplied, the mother remarked: "He can now sit up and walk again."

This, in brief, is the history of the first case in which I applied the plaster dressing completely around the body from the pelvis to the axilla. Since that time it has constituted almost the only treatment which I have adopted for Pott's disease.

The Proper Manner of Applying Plaster-of-Paris Bandages in Spondylitis.—Crossbarred muslin or crinoline should be the material used in making the bandages. Frequently the kind of sizing used in the manufacture of this muslin prevents the plaster from setting quickly. It should therefore be washed to get rid of the superfluous sizing before being torn into strips from three to four inches in width and three yards in length. Of course the selvage is to be torn off. These strips are drawn through a tray filled with freshly ground plaster of Paris, and enough rubbed into the muslin to fill all the meshes. The bandages are then rolled moderately tight and laid in an air-tight tin until required for use.

The patient should have the body covered with a tightly fitting knitted or woven woolen shirt, without sleeves, tied tightly over the shoulders and drawn down and securely

pinned over a folded towel in the perinæum. For this purpose a safety pin should always be used. If the patient is a female, pads of proper thickness should be placed over the mammæ and under the shirt, which pads are to be removed when the plaster sets, thus preventing pressure on the glands. Another towel, folded in such a shape as to cover the stomach and bowels, called the "dinner pad," which also is to be removed after the plaster sets, is placed inside the shirt, thus providing space for the expansion of the stomach during the process of digestion. If the patient has partaken of a hearty meal just previous to the application of the plaster, this dinner pad may be omitted.

The patient, being now prepared for the application of the plaster, is placed in the suspending apparatus, which has been heretofore accurately described in my several works on this subject, care being taken that the traction be evenly divided between the head and axillæ.

Traction is now made very slowly and gently, *and only carried to the point of giving the patient perfect comfort, and never beyond that point.*

In some cases the heels will be slightly raised from the floor before this point is reached, but in many instances the heels will not be raised from the floor at all; and as the sensations of the patient are the only guide as to the amount of traction needed, an anæsthetic should under no circumstances ever be given, as has been done by some surgeons, as one requires the intelligent co-operation of the patient himself in regard to the amount of traction required. If it is a child not old enough to talk and tell its feelings, watch carefully the expression of its countenance; and when it is changed from pain to pleasure, there stop, *never making traction beyond that point*, and immediately apply the plaster bandages with great care and accuracy,

pressing them into all the irregularities and covering the entire trunk from the pelvis to the top of the sternum.

If the patient is kept suspended in this position till the plaster is set, it will retain the body in the position of perfect comfort which suspension has given it.

In applying the bandages, one should be placed *on end* in a basin or pail of tepid water, *deep enough to completely submerge it*, when bubbles of gas will at once begin to escape. As soon as the bubbles cease, the plaster will be all moistened and the bandage ready for use. Do not add salt to the water, as it renders the plaster brittle. Squeeze out the superfluous water before applying it, and place another roll, *end up*, in the water, which will be ready for use by the time the first one has been applied, and proceed thus until the entire jacket has been completed. The reason for placing the bandages *on end* in the water is that the gas may escape and thus enable all the plaster in the roll to be evenly moistened. If laid on the side, the moisture will only extend to some parts, leaving others dry and unfit for use.

The patient being suspended, the jacket is applied by the surgeon, standing or sitting at the back of the patient, while an assistant sits in front, steadying the patient by his knees and rubbing and smoothing the bandages which are being applied.

Begin at the waist, taking one or two turns around the smallest part of the body, and then going down in a spiral form, each layer overlapping the other half or two thirds of the width of the bandage until reaching the trochanters; then, having taken one or two turns around the pelvis, reverse the bandage, and gradually proceed in the same spiral manner upward until you have covered the entire body to the top of the sternum.

This process is repeated till there are a sufficient num-

ber of thicknesses to support the body, the number of bandages to accomplish this object, of course, depending on the size of the patient.

In cases where the disease is in the lower dorsal or lumbar vertebræ this is all that is required. If the disease is at the mid-dorsal or cervical vertebræ, it then becomes necessary to add the jury-mast to the jacket in order to take off the weight of the head from the vertebral column.

In many instances great advantage is derived from the addition of Whitman's shoulder brace to keep the chest well expanded, and press the shoulders back into the jacket.

In the great majority of cases the jacket can be applied while the patient is suspended vertically, with the greatest ease to himself and the surgeon; but in exceptional cases, where there is paralysis, where the heart is too weak to allow the patient to remain upright for any length of time, or in cases of excessively fat and feeble people, Davy's hammock, with holes cut to allow projection of the head and feet, is to be preferred, traction being made at both ends of the body to the point of comfort while the jacket is being applied.

Now, to pass to the subject of lateral curvature of the spine, a deformity which has nothing in common with spondylitis, except that they both affect the spine—and I might say in passing that, surprising as it may seem, there appears to be in the mind of the profession at large very often a hazy mingling of these two troubles, which bear about the same relation to each other as tumor albus and genu valgum, and, although I have written repeatedly and at length on the different modes of employing plaster of Paris in the treatment of these two affections, it seems to me, from the papers I read in the various medical journals, that a number of physicians are still under the erroneous impression that I use gymnastic exercises in cases of Pott's

disease, and employ immovable plaster jackets in cases of lateral curvature. In the treatment of lateral curvature the position that I hold is, that a large number of cases if seen early may best be treated by improvement of the general tone of the system, increasing muscular strength, and educating the muscular sense of the patient to the correct carriage of the body without the aid of any mechanical support whatever. In other cases it is not sufficient to rely upon the patient alone, but recourse must be had to artificial support to hold the trunk in a correct position until the patient is capable of voluntarily maintaining it so ; and in a third class, where marked deformity is present, oftentimes accompanied by great pain and disability, artificial aid is often necessary to support the body in an improved position during the entire life. One of the most useful means, in my experience, of rectifying lateral curvature of the spine has been vertical, partial self-suspension accompanied by manipulation, and with me nothing has been so serviceable in holding this improved position as a corset made of flexible material applied to the body in its improved position, which, then hardening, retains this improved shape ; and of the various plastic materials that I have tried, plaster of Paris has answered my purpose better than anything else. I wish to raise my voice in emphatic protest against what many gentlemen seem to regard as my method of treatment in lateral curvature—namely, placing the patient in a plaster jacket and leaving her there for a number of months, then removing the jacket and replacing it by a second. The plaster corset is simply for the purpose of holding such improvement in position as you have been able to obtain by your manipulations, and does not in any way improve the shape of the patient beyond this, and should be renewed as often as improvement in the form justifies, and worn only so long as the patient is un-

able voluntarily to maintain an equally good position without its aid; and during the treatment it is essential that the corset be removed while the patient exercises daily for the purpose of gaining that increased physical health and muscular tone which are necessary to the successful treatment of lateral curvature of the spine.

In applying plaster-of-Paris bandages in cases of lateral curvature, a shirt of double length is used, pads are placed over the mammæ, and a strip of tin two inches wide is placed next the skin from the sternum to the pubes, on which to cut off the plaster; and, instead of being suspended by the head and axillæ, the patient suspends herself by pulling on the free end of the rope which passes from the head-swing over the pulley, while she keeps the arms outstretched, the upper hand being on the concave side. As soon as the plaster is set, which should be the case by the time the corset is finished, it is split open down the front and removed while the patient is still suspended. A thin slice is then taken from each edge of the slit and the corset held together by a roller bandage and dried. When dry, the next day, it is put on the patient while again self-suspended, and fastened by a roller bandage; then trimmed out under the arms and above the thighs until comfortable, and removed. The extra length of shirt is then reversed over the jacket and sewed to itself, covering in all the plaster, and lacings are sewed on in front.

Without wearying you further by speaking of my own ideas on these two subjects, I would pass to the opinions of others, as any treatment which will not stand the test of time and criticism is not worthy of acceptance.

While the first demonstrations of this method of treating Pott's disease and lateral curvature were received with marked enthusiasm in all parts of the world, wherever the demonstrations were made, it remains to be seen whether,

after the lapse of twenty years, the same enthusiastic approval will be accorded to it, and I accordingly have written the following letter to some hundred of the most distinguished orthopædic surgeons in various parts of the world :

285 FIFTH AVENUE, NEW YORK, *November 19, 1894.*

DEAR SIR: I have been invited to read a paper before the New York Academy of Medicine on January 3, 1895, on The History of the Treatment of Spondylitis and Scoliosis by Partial Suspension and Retention by Plaster-of-Paris Bandages—setting forth the present status of this form of treatment before the medical profession of the world after twenty years of experience.

Will you kindly let me have, at your earliest convenience, your views on this subject, whether for or against the plan of treatment, together with such other suggestions as you may choose to make, in order that I may embody them in my report.

Trusting that I may have the pleasure of an early reply, I am,

Yours very truly,

LEWIS A. SAYRE, M. D.

I have received answers from a large number of them, and have embodied extracts from them in this report. Those that are opposed to it I will read entire; of those in favor I will use only extracts.

Robert Jones, Liverpool, said: "I am not favorable to suspension in the treatment of lateral curvature, and would trust entirely to exercises, muscle-beating, and, where necessary, elevation of the heel of the boot."

E. Muirhead Little, London, says: "*In re* gypsum jackets, I have not used one for many years. I prefer poro-plastic, felt, or steel supports."

Bernard Roth, London: "I have treated with much success upward of two thousand cases of scoliosis, including many of extreme deformity, by my method of posture and exercise, without any mechanical support whatsoever, and I never found suspension of any use in *scoliosis*."

"In reference to *spinal caries*, for the first ten years of my

practice as an orthopædic surgeon I applied your plaster-of-Paris bandages almost exclusively with varying success, but for the last ten years I have discarded them altogether in favor of the late H. O. Thomas's spinal splint with axillo-spinal straps. I have modified this splint, so that the patient's back can be uncovered for examination and the instrument replaced and re-fixed while the patient is lying prone the whole time."

Noble Smith, London: "Probably the most fallacious form of treatment is that of applying plaster-of-Paris jackets. Among the many enthusiastic surgeons who at first made use of them, there are very few having had much experience who have not now given them up as a failure. Plaster-of-Paris jackets ought to be utterly condemned, because, first, of their great weight; second, their interference with free respiration and cleanliness; and third, the fact that they act simply as heavy, unscientific corsets, pressing upon the chest, and add very little to the support of the spine."

B. E. McKenzie, Toronto: "With the exact manner of treatment referred to I have had but little experience. For several years I have employed some form of gymnastic treatment associated with the employment of forceful correction through suspension, with lateral traction, manipulation of the spine, etc. The objection which presents itself to me in the use of any retentive appliance is that it tends to atrophy and to produce weakness of the trunk instead of aiding in the development and strengthening of the parts."

H. Hodgen, of St. Louis, does not think he has ever seen a very good result in scoliosis from the use of the jacket, and prefers the steel assistant.

John Ridlon, Chicago: "I have used the permanent plaster-of-Paris jacket in spondylitis from time to time during the last twelve years, applied as you directed, with the patient partially suspended, when I have been unable for any reason to obtain an antero-posterior steel spine brace of the Taylor pattern. I have also used the plaster jacket in certain cases of spondylitis where the lateral deformity was so great that the steel brace could not be satisfactorily adjusted. In all those cases where the jacket has been used for the posterior curvature simply I

have not been able to prevent an increase of the deformity, and in all those cases that have come under my observation after having been treated by other surgeons I have been given a history of steadily progressive increase of the deformity. . . . In those cases, however, where there has been marked lateral deformity I have found the deformity progressively diminish under treatment by the plaster jacket; but in these cases I have not continued the treatment with the jacket after the lateral deformity had disappeared and with the posterior curvature increased to any considerable extent.

"In scoliosis it has been my custom for the past two or three years to use the laced plaster jacket in all cases except the very slight ones. I use it in connection with partial suspension and pressure by the squeezing machine, and I am satisfied that I have obtained a much greater degree of correction of the deformity than I had been accustomed to obtain either with exercises alone, after Roth's method, or with the use of the leverage lateral brace formerly applied, and perhaps still used, by Dr. Shaffer of your city. Under treatment by Dr. Shaffer's brace I used to find nearly all my cases grow somewhat more deformed. None of them made any material gain, although treated for long periods. Under the exercise treatment of Roth very slight cases at times fully recovered; moderately severe cases gained somewhat, and rarely ever grew worse; in severe cases the deformity did not in any way diminish, and some few did not appear to receive any benefit whatever. At this time I am satisfied that the plaster corset used in connection with the squeezing machine and exercises gives in my hands the best result in the treatment of scoliosis."

James K. Young, Philadelphia: "In answer to your favor of November 28th, asking for my views upon 'The Treatment of Spondylitis and Scoliosis by Partial Suspension and Retention by Plaster-of-Paris Bandages,' I can best answer by quoting from my recent work, *Treatise on Orthopaedic Surgery*, 1894, under the treatment of these two subjects:

"*Spondylitis*.—After describing the technique now employed, I say: 'While possessing certain advantages of economy, requiring less special experience in its application, and be-

ing entirely beyond the control of the patient or attendants, there are certain positive disadvantages—the encircling of the body within a solid support, the inability to inspect the condition of the skin and note the progress of the affection, the formation of excoriations, ulcerations, and abscesses without the knowledge of the surgeon, the lack of cleanliness, etc.—which relegate it and its modifications to a secondary position. When split, furnished with lacings, and applied and removed at will, it loses part of its efficiency, but there is a gain in comfort and cleanliness. It is of decided value, however, for patients who are unable to bear the expense of even the cheapest apparatus; in such cases, with attention to detail, a cure may often be effected, and the writer has in public practice frequently proved this statement, especially when the disease was located in the lumbar region.

“In justice to this mode of treatment it must be added that there are certain cases in which it is the best and most efficient; this applies particularly to the lateral deviation of the spinal column present in certain cases of Pott's disease and in lower lumbar disease. It is, moreover, important that the surgeon be familiar with both the plaster-of-Paris jacket and the spine brace, adapting each to the special requirements of the individual case.’ Individual experience leads me to employ the steel spine brace wherever it can be carefully adjusted at short intervals under personal supervision.

“*Scoliosis*.—I believe in and employ partial suspension, but do not now employ plaster-of-Paris jackets in the treatment of scoliosis. I prefer to treat these cases early by mild, long-continued movements, exercises, posture, and massage—methods by which I have achieved the greatest success.”

Thomas G. Morton, Philadelphia: “In private practice I do not use the plaster apparatus you refer to, but at the Orthopædic Hospital we now and then resort to it when the patient is unable to procure the Lentz spinal apparatus which we commonly use.”

Joel E. Goldthwait, Boston: “I would say that for routine treatment I use a form of back brace, practically the Taylor, reserving the suspension and jackets (plaster) for those cases

which the brace fails to hold, or in which there is lateral deformity.

"In these cases, if ambulatory treatment is desired, I think the jacket is by all odds the best form of treatment."

Charles L. Scudder, Boston: "I have nothing novel or new to add to the common experience of surgeons with this form of retentive apparatus. I would say simply that in cases of caries of the spine below the tenth dorsal vertebra in which for some reason or other it may be undesirable to use steel braces, I find the plaster-of-Paris jacket, applied well over the hips and up to the axilla, efficient.

"In the application of this plaster dressing I am inclined to use more and more the hammock as a means of extension rather than the tripod and sling."

Robert W. Lovett, Boston: "I have used in the treatment of lateral curvature the plaster jacket, I think in all its forms, and with certain modifications I still continue to use it. Believing as I do very firmly in gymnastic treatment as an essential part of the treatment, I have abandoned the use of the fixed jacket except in unusual cases, where I apply it to a patient who is forcibly corrected, leaving it on only for a short time. This measure I have found of use in some of the very severe cases. It is applied under suspension.

"A method which I have used extensively has been to apply a jacket to the patient while suspended, cut the jacket off down the front, and fill it with plaster, thus obtaining a cast of the body; then, by the method described by Dr. Bartow, of Buffalo, I remove the prominence on the convex side of the cast, building it up on the opposite side; in some cases over-correcting the deformity, in other cases bringing them nearly to the straight line. To this cast I apply a jacket over an under vest, cutting it down the front and having it provided with lacings. This I have been accustomed to use in connection with gymnastics and forcible correction. It represents the patient's condition as it would be if a decided improvement had taken place, of course. I am a believer in the efficiency of this 'corrected' jacket.

"I have also used braces to accomplish the same purpose. I

can not account myself an advocate of the jacket to the exclusion of the brace, and I use sometimes one and sometimes the other. In milder cases I depend for the most part on gymnastic treatment. I trust I have answered your inquiries."

133 NEWBURY STREET, BOSTON, *December 10, 1894.*

MY DEAR DR. SAYRE: In reply to your communication, let me say that I find the treatment of Pott's disease by partial suspension and retention by plaster-of-Paris bandages in a large number of cases of caries of the spine to be most beneficial. It is particularly adaptable for cases of disease below the seventh dorsal. In the convalescent stage I use removable jackets—either plaster, leather, paper, or aluminum removable corsets—where these are within the means of the patient. In a number of cases, however, I make use of braces. These are largely in the cases that are in the upper portion of the spine and where careful nursing can be given. In such cases, where thorough nursing can be given, I am in the habit of making an antero-posterior support. In certain acute cases a fixed plaster jacket seems to give a more thorough support than the brace as ordinarily applied. It has seemed to me that an antero-posterior support could be made to hold as well as a plaster jacket even in the portion of the spine to which the plaster jackets are most suitable, but practically, in the majority of cases of the acute sort, certainly in poorer practice, a plaster jacket will be found the readiest and most efficient. In lateral curvature I am also using plaster-of-Paris jackets with partial suspension, but I have combined with it also a later traction and direct pressure. Here, again, I am in the habit of using substitutes for plaster jackets—namely, leather, paper, and aluminum.

With sincere regards, E. H. BRADFORD.

Henry O. Marc, Boston: "I thank you for calling my attention to the paper which you have in preparation. I am sure that I can add very little of value upon the subject, since from the first I have considered you my master, and take pleasure in writing you the reasons which caused me to first seek your acquaintance. The first article which you published upon the treatment of angular curvature of the spine by means of suspen-

sion and the application of the plaster jacket impressed me so favorably that after its careful study I went to New York for the sole purpose of seeking your instruction, and, thanks to your courtesy, I did not return until I had familiarized myself with every detail.

"It is very probable that I was the more favorably impressed with your method, since for some years I had used plaster bandages for almost every variety of fracture. . . . Another case which I cited, of a woman confined to the bed because of a dorsal curve, at once commenced her work after the application of the jacket, at which time she was three months pregnant. She refused to part with her jacket or have it replaced by another, chipping away in front as the enlarging abdomen demanded, until her labor commenced. No other jacket was applied, and somewhat recently I had the good fortune of examining her, all these years the resulting cure having remained complete with only a slight deformity. As you are well aware, procedures emanating from any other source have been accepted by the Boston profession only after repeated proofs of real merit. To this conservatism your teaching proved no exception. I was not alone the first to introduce plastic splints to the profession of Boston, but also your methods of the application of the plaster jacket, and unweariedly wrote and talked upon the subject. Much excellent work has been done here for a good many years, especially at the Children's Hospital, but unfortunately the general profession are still wanting in technique and training. I inclose you a reprint of 1877 upon Plastic Splints in Surgery, and call your attention to its closing sentences. What I then said I now repeat, but more than all as the outcome of your teaching upon this subject do I prize a personal friendship."

ALBANY, N. Y., *December 14, 1894.*

Lewis A. Sayre, M. D., New York City:

MY DEAR DOCTOR: In reply to your letter of November 19th, I am reminded largely of the early history of your work in the treatment of spondylitis and scoliosis when first presenting the subject to the attention of the New York State Medical

Society. You will remember that I was the first who presented a case—that of Miss M.—for your treatment, application of the bandages, etc., and the result was quite decidedly satisfactory. While for the past five years my line of practice has been away from orthopædic surgery, yet my impressions, in answer to your questions, would be that my results in the treatment of angular curvatures of the spine have been decidedly satisfactory. In the treatment of lateral curvature I can not speak so emphatically. For angular curvature I applied the first plaster-of-Paris dressing put on in this city, after having read a report of one of your clinical lectures at Bellevue Hospital on the subject. I applied the *bandages directly* to the surface of the body, and had the pleasure of seeing the little patient do remarkably well.

Hoping these few stray notes will be of service to you, and that you will pardon my delay in answering, believe me,

Sincerely yours,

A. VANDER VEER.

Lewis Balch, of Albany: "I have not applied a plaster jacket for six or eight years. From the time you put on one before the State Medical Society, in the winter of 1878—I think that was the date—up to 1886, I used the jacket for all cases of spinal curvature coming under my charge. In general I can say the treatment was successful, but I noticed in some cases of rotary lateral curvature the patient seemed to slip down through the jacket, no matter how carefully it was applied, and the treatment failed. Eventually I had better success in antero-posterior curvature than in the other.

"I know the jackets were properly applied, for you taught me how to put them on both here and in your own office."

M. H. Burton, Troy: "I have used the Sayre jacket in treating cases of spondylitis and scoliosis in the Troy Hospital and in private practice with decided and manifest success. I have witnessed its use in Marshall's Infirmary, Troy, N. Y., and the results were not gratifying. I have seen cases also which had been treated by yourself, and found complete recovery the result. It would not be within my province to suggest to you in regard to the Sayre jacket or the counterpart appliances.

"Your experience and knowledge in the matter preclude such suggestions, if I had any to make—which I have *not*. As compared with other jackets or appliances, I find no single point in their favor, so far as experience and observation give me knowledge.

"In all respects I find the Sayre plaster-of-Paris appliances or jackets the most efficacious, convenient, and valuable, and the ones causing the greatest success in the treatment of the diseases for which we apply them."

R. B. Bontecou, Troy: "Your letter of November 19th was duly received, and I have nothing more to state than what the profession at large have stated and will state in admiration of your device to accomplish physiological rest by fixation, which I believe is the great principle to observe in the treatment of disease of the spinal column and the greater joints. I have relieved and cured a multitude of suffering humanity by your method, both in hospital and private practice—adults as well as children. Of late years I have substituted water glass of heavy specific gravity for the plaster, finding it equally resistant and durable, and lighter, and can be cut open when necessary and used as a corset more readily than plaster.

"I have also, in children with posterior spinal deformity, often substituted the prone position in a hammock of cotton flannel, with advantage, utilizing the hammock as one of the envelopes. It is certainly more comfortable for children than the vertical position."

Ansel G. Cook, Hartford: "About eighty per cent. of my cases of spondylitis wear solid plaster-of-Paris jackets, with or without the jury-mast; about fifteen per cent., plaster or leather corsets made to lace in the front; and about five per cent., for various reasons (position of abscesses, imperfect development of hips, complications of other joints, etc.), wear various forms of braces. This does not include the very severe cases that are confined on wire or plaster and board cuirasses, or a class of cured or convalescent adults whose backs are not strong and who require some support. These do best, I find, with a light back brace, padded the whole length of the brace, worn under an ordinary pair of corsets.

"The mild cases of scoliosis I treat with exercises alone ; the more severe, with exercises supplemented with braces that do not hold, but compel the patient to hold himself, in a corrected position (you will note the distinction); and the most severe, with plaster-of-Paris or leather corsets. I hope your paper will touch on the subject of suspension, forcible correction and retention, which has so many enthusiastic advocates at present.

"A great deal of trouble, I think, arises from improperly made and badly fitting jackets ; it certainly requires considerable practice to make a good one, and when a man condemns plaster jackets you are inclined to agree with him when you see the thing he has made and calls a jacket. On the other hand, the man who sends his patient to an instrument-maker to have a brace fitted, without giving accurate directions as to how the brace shall be made, and attending personally to the fitting of it, is not likely to get any satisfactory result."

Dr. Lewis A. Sayre :

BUFFALO, December 5, 1894.

MY DEAR DOCTOR: In reply to your favor of November 19th, asking my views in the matter of the treatment of spondylitis and scoliosis by plaster-of-Paris bandages, I would say about as follows: First of all, I would wish to acknowledge the benefits which I, like all other surgeons, have received from the views upon treatment which you have published so widely and with which your name is so inseparably connected.

So far as the treatment of acute spondylitis is concerned, and at that time when absolute fixation is so absolutely necessary, I must say that I know of nothing that can take the place of a plaster-of-Paris corset. With regard to the later treatment at a time when plaster has become irksome, or when the acute stage is past and the patient's personal comfort can be more consulted, I must say that, for my own part, I think that other mechanical devices can be substituted which permit of sufficiently frequent removal to keep the patient more comfortable. I do think that braces or jackets of various kinds can be devised that give sufficiently complete fixation to meet the indications, and that are much more agreeable for the patients. But,

in the early and very acute stages, and in a certain class of hospital and dispensary patients, I think that plaster or its equivalent, yet to be discovered, more completely fills the indications than anything else.

With regard to scoliosis, it is not my own personal custom to resort much to plaster jackets, except as I may put one on in order to obtain a cast of the body around which to construct a suitable brace. I think these cases are more often injured by too long rest of the muscles, and for all except the inveterate cases I much prefer a movable corset which will permit massage or very much more active muscle training. The more I study and have to do with lateral curvature, especially in the young and growing, the more I believe in the expediency of gymnastic treatment, and the less absolute reliance I like to place upon support. I may sum it all up by saying that in my estimation a happy combination of the two constitutes the best treatment.

I appreciate your request for my own views, which I advance with no little hesitation to such an authority as yourself, and am, very sincerely yours,

ROS WELL PARK.

KANSAS CITY, Mo., *December 4, 1894.*

Dr. Lewis A. Sayre, 285 Fifth Avenue, New York:

MY DEAR DOCTOR: Yours of the 19th just to hand, and I would say in reply that in spondylitis of the upper dorsal and cervical region I have used with good results and advocate recumbency. Where the disease is manifest below this part, I use suspension and retention by plaster-of-Paris bandages—fixed dressing if the trouble is active, and movable apparatus or laced plaster-of-Paris dressing if angular curvature has taken place. In scoliosis I find the suspension and retention by the plaster-of-Paris bandages, cutting down and lacing, my best method.

Your friend,

J. D. GRIFFITH.

MINNEAPOLIS, *December 3, 1894.*

DEAR DR. SAYRE: In reply to your kind letter, would say in the majority of cases of spondylitis I use partial suspension and retention by plaster of Paris, and when I do use a steel support it is usually to cater to the prejudice of my patient, for *since I have known how to apply the jacket properly I have*

been able to do more good to a greater number with it than with any other means at my command.

For the past two years in treating scoliosis I have abandoned braces and supports of every kind, and I believe with advantage to my patients, except in cases in which the deformity is increasing *very fast*, and then I apply a plaster jacket until I have had time to build my patient up and get her able to stand alone as it were.

Faternally, J. E. MOORE.

Hunter McGuire, Richmond, Va. : "Your letter of November 19th has been received. In the treatment of spondylitis nothing, in my opinion, is better than partial suspension and retention by plaster-of-Paris bandages. Having a son with this disease, there is nothing in medical literature on this subject that I have not studied. I have practiced several other devices, but have never found anything equal to the plaster-of-Paris bandages. When I use them in scoliosis, however, I always arrange them so they can be removed, and endeavor to strengthen the muscles by massage, electricity, and gymnastics."

116 SOUTH EIGHTEENTH STREET,

PHILADELPHIA, November 28, 1894.

MY DEAR DR. SAYRE: In all cases of spondylitis in the early stages, where the patient is not confined to bed, I use plaster-of-Paris bandages, as suggested by you. Later, in private practice, I use some form of steel supporting apparatus. In my hospital work and among the poor I usually employ plaster-of-Paris jackets from the beginning to the end of the treatment of the case, and at all times when the cost must be considered.

In scoliosis I use the plaster-of-Paris jacket, which is re-applied at short intervals, to support the spine and overcome the deformity, believing that we can accomplish better results in this way than by more expensive and cumbersome apparatus.

When the curvature has been overcome I apply some form of light supporting apparatus. Of course in scoliosis I do not neglect to use stretching and pressure, with gymnastic exercises, to increase the flexibility of the spine.

I shall be glad to give you more details if this short account is not sufficient.

Believe me, very truly yours,

WILLIAM J. TAYLOR, M. D.

November 28, 1894.

Dr. Lewis A. Sayre, 285 Fifth Avenue, New York:

DEAR DR. SAYRE: In reply to your note of the 19th I would most gladly say that the profession owes much to you for developing the use of plaster of Paris as a surgical dressing in a great variety of cases and conditions. In regard to its use in spondylitis, it has been a Godsend to hundreds of poor people who would otherwise have been without this most economical and effective method of fixing the spinal column until repair takes place. I know of no method so convenient for producing absolute fixation of the bones of the spinal column. It certainly has its disadvantages; but your work in this line has stimulated efforts at substitution which have obviated its disagreeable features. The great principle underlying the treatment, however, that of rest and fixation, has steadily and persistently taken firm hold upon the profession at large. While method and means may change, the principle will live.

In regard to self-suspension for scoliosis, it is one of the helpful means of rectification, and I value it highly. I am opposed to apparatus for scoliosis, both on theoretical and practical grounds, whenever it can be avoided. I believe in strengthening the muscular power by active and passive gymnastic movements, as I consider them the essential elements in effecting a cure. At the same time I do not deny that there are cases rapidly growing worse which require permanent support.

When plaster of Paris is used in these cases it should, in my judgment, be employed as a corrective agency, with constantly increasing pressure upon the projecting portions of the body, as advocated by yourself and by the plan of Bartow. Thanking you again for the earnestness with which you have pursued this branch of surgical work, I am

Yours very sincerely,

DE FOREST WILLARD.

John Chalmers De Costa, Philadelphia: "The custom in the Philadelphia institutions with which I am connected is to treat acute and early spondylitis by means of rest in bed, and to rely entirely upon plaster of Paris, applied during suspension by your method, for the completion of all cases and the cure of patients."

1611 SPRUCE STREET, PHILADELPHIA, *November 30, 1894.*

MY DEAR DR. SAYRE: I am in receipt of your letter of November 19th. I am very strongly in favor of the plan of treatment by plaster of Paris, applied during partial suspension, in cases of spondylitis below the mid-dorsal region, also as a means of holding a jury-mast in cases above mid-dorsal region. I am strongly opposed to the use of plaster of Paris applied in any position for scoliosis where it is allowed to remain for more than one week's time, because it tends to increase the muscular atrophy from disuse. I believe that it would interfere with the object of your paper did I do more than briefly state my views as above. I can but believe that the mechanical advantages of plaster of Paris have been seriously interfered with by the injudicious employment of it in unsuitable cases and in an unmechanical manner. It has often appeared to me that plaster of Paris was applied apparently with the idea that it acted as a therapeutic measure by absorption in some such way as many of the nostrums are supposed to act. It is only in this way that I have been able to explain the irrational manner of its application. I remember saying in one of my clinical lectures that it seemed a great misfortune that Professor L. A. Sayre could not communicate his skill in selecting the cases suitable for the method as well as his skill in applying plaster of Paris, to prevent the terrible abuse to which it has been subjected.

Yours most sincerely,

H. AUGUSTUS WILSON.

B. Merrill Ricketts, Cincinnati: "In reply to your request for my opinion concerning the treatment of spondylitis and scoliosis by partial suspension and retention by plaster-of-Paris bandages, I will say that this method is, I believe, the best thus far presented when applied with skillful hands.

"Its advantages.

1. Non-elasticity.
2. Perfect adjustment.
3. Inexpensiveness.
4. Convenience.
5. Rapidity.
6. Frequent reapplication.
7. Continuous adjustment.

Disadvantages.

1. Uncleanliness.
2. Excessive weight.
3. Liability to fracture.
4. Irritation by small particles of plaster.
5. Absorption of secretions.

"To overcome the disadvantages, I have, as a rule, used the leather jacket supported by steel made from the original plaster cast. The leather jacket does not meet as many requirements as the plaster, but, until some of the disadvantages of the plaster are overcome, I believe it will be necessary to use the leather, believing that it excels the other substances, such as metal, wood, paper in any form, or any of the various apparatuses."

Edmund Andrews, Chicago: "The plan is a valuable one in many varieties of cases. One of the important advantages in the West is that family physicians in distant mountain and prairie regions, far away from instrument-makers, can always make use of it.

"Another advantage is that by its use the remote physician protects his patient from getting useless and injurious braces made by city instrument houses from inadequate measurements sent by mail.

"The practical difficulty as to its use by distant country practitioners is the tendency of some of them to leave it on without change so long that the skin becomes foul and offensive, and their neglect to guard the prominences of bone, thus producing ulcers by the pressure.

"As the patient may be ten or fifteen miles distant over bad roads, they think they can not go to him very often.

"It is a serious question for a far-off country doctor as to what he can do for a distant spinal case having scanty pecuniary means. My extensive correspondence with these people has impressed me strongly with their difficulties. I use the plaster jacket frequently, but in many other cases I prefer apparatus of other material."

W. R. Whitehead, Denver: "I recently received your letter about spondylitis, and hasten to reply at my earliest convenience. I wish that I could add something really valuable and interesting to what I have already expressed concerning your treatment of this disease. I am sure, my dear doctor, that no one appreciates your efforts in this matter better than those who have profited, as I have, by your instruction in the application of this the most valuable means of treatment, in my opinion, of Pott's disease of the spine, which is one of the

most troublesome surgical affections with which we have to contend.

"I am opposed to all stiff braces as inefficient, painful to the patient, and often a most useless expense. The trouble is, generally, that the Sayre jacket is not properly applied; it is almost always, in my experience, too heavy, or the plaster is of poor quality; sometimes the piano-felt pieces about the hips are omitted, or there is something about the jacket that shows inefficiency in its application, or a want of proper knowledge of or proper appreciation of the purposes for which it is applied, as simple as they are. These things are not the fault of the Sayre jacket, but the fault of those who sometimes attempt to avail themselves of this excellent device—indeed, the fault of the *medicus imperatus* with which this country is abundantly supplied. Take, for example, an intelligent country doctor, far removed from all the conveniences of a city, and if he understands how to apply your jacket properly, and has any ingenuity at all and a little *good* plaster of Paris, he can, in my humble opinion, make for his patient a better and more comfortable and more useful appliance for the treatment of spondylitis than all the nickel-plated steel braces and other spinal 'contraptions' offered for sale and advocated by instrument-makers and recommended by their inventors."

"P. S.—Some doctors, it seems, are invited to send east a mold of the bust in plaster, and a jacket will be furnished shaped after such a mold. My comments are that a doctor who has not experience and sense enough to make a suitable jacket can not make a good mold."

Henry M. Sherman, San Francisco: "I am very glad indeed to submit to you, my old master in my art, my experiences and conclusions in regard to the plaster-of-Paris jacket, and to let such of them as merit it reach the profession through your paper.

"I advance the following propositions:

"1. In cases of vertebral tuberculosis, when the lesion is below the ninth dorsal vertebra, the treatment by 'partial suspension and retention by plaster-of-Paris bandages' is incomparably the best, always excepting those cases in which for special

and obvious reasons—hernia, abscess, sinuses, etc.—no plan which contemplates the rigid enveloping of the body can be allowed. I am sure this contention can be made, though I have been obliged to modify my earlier views of the ‘work’ of a jacket both as a splint and as a support.

“2. In cases of vertebral tuberculosis, when the lesion involves the eighth and ninth dorsal vertebræ, the choice lies between the jacket and a brace, the former being suitable for milder cases, and those in which a compensatory lordosis could be easily developed both above and below the kyphos.

“3. In cases of vertebral tuberculo-sis, in which the lesion is above the eighth dorsal vertebra, the plan of treatment should include carriage of the head by apparatus, and in all such cases the supporting point of the mechanism is the pelvis, which is embraced by a jacket of plaster of Paris or a pelvic belt of leather. For the support and carriage of the head I prefer the steel fork and aluminum chin collar which I have described.

“4. In cases of scoliosis the plaster-of-Paris jacket as a rigid all-embracing splint on the trunk is the most satisfactory means to hold and make permanent the correction gained by gymnastics, forcible correction of deformity, etc.; but its function is purely that of a splint—*i. e.*, retention, not correction—and, like all splints, muscular weakness of the muscles corrected and aided by it results from its too exclusive and too prolonged use. I am myself working with a fair amount of success on the lines of these proportions. Of course, I can not claim them to be universally applicable, and have myself exceptions to them in my practice, but they are a more than good set of working rules.”

R. H. Plummer, San Francisco: “My experience in this method of treatment reaches through a period of fifteen years, during which time I have applied it not only in private practice, but in Cooper Medical College Dispensary as well, and it affords me great pleasure at this time to testify to you in no uncertain terms my appreciation of the merits of the method of treatment. . . . That the method has not given unqualified satisfaction to all who have attempted to use it goes without saying. Failures arise from various causes, as improperly selected

cases (incurable) ; improper materials used, as unsuitable shirts ; unskillful application of the bandages ; and a general injudicious management of the case as to exercise, etc. All these deficiencies may be summed up in four words—viz., ‘ignorance of the method.’ If all who essay to use it would first familiarize themselves with your writings upon the subject, and especially if they could avail themselves of the benefit of your personal instruction as to details, etc., the method would not suffer at their hands, and their patients would invoke blessings on their lives.”

L. C. Lane, San Francisco : “I fully approve of your method of suspension and retention by plaster-of-Paris bandages in the treatment of spondylitis and scoliosis. I regard this plan of treatment as one of the most important additions made to surgery during the present century.”

S. H. Pinkerton, Salt Lake City : “In the treatment of spondylitis I consider the partial suspension and a properly applied plaster-of-Paris jacket (with its modifications) superior to all mechanical appliances.

“In scoliosis I have had very good results with a removable plaster of-Paris jacket (or corset) together with gymnastics.”

William E. Wirt, Cleveland : “It has been my experience as an orthopædic surgeon to have applied at least two hundred, possibly double that number, of plaster-of-Paris jackets to cases of Pott’s disease. I consider this jacket a great boon to these unfortunate children, especially when the disease occurs among the poor and ignorant—in fact, nothing can take its place. Among the wealthy and intelligent, and more especially those whom we may trust to carry out directions, I have found a modified Beely corset to be more satisfactory. In certain cases of Pott’s disease, where I had ordered a spinal brace, I have found that no amount of fitting and adjusting would make it comfortable to the patient, and in such cases would have to return to plaster jacket or felt corset.

“In scoliosis I do not favor the plaster jacket as a measure of treatment, but I simply use it as a means of getting a mold which I still further improve in shape (over that gained by suspension) before molding upon it a felt corset.”

S. A. Wright, Manchester: "In reply to your question:

"1. I have never used any fixed apparatus for scoliosis.

"2. For caries of the mid and lower dorsal and lumbar region I have always used, and do still use, Sayre's jacket largely, but not in cases where there is an abscess, nor in cases where the disease includes the upper dorsal region. I am not strongly impressed with the value of any form of jury-mast, and where the jacket is inapplicable I prefer bed or a metal spine spring."

C. H. Golding-Bird, London: "*Re Scoliosis: (a) Plaster Bandages.*—After a continued trial of the bandages in these cases I abandoned them; not that they did not at first give the greatest support, keep the spine straighter, allow of the chest being kept (in bad cases) more expanded, but because I found these results to be but temporary. In spite of the exercise with the tripod I did not find that the musculature of the trunk improved to the degree requisite for the patient's maintenance, as the improved position is to be obtained rather by the best possible development of the muscles (whereby the wearing and weaying muscle pain attendant on these cases is abolished and the patient rendered able to be about with comfort) and not by the most perfectly shaped back, if the muscle tone can not at the same time be maintained to the full. I less and less, therefore, use supports, preferring to throw the onus of maintaining an improved position on the patient's own muscles, being careful to give alternately with calisthenics such rest as in each case is needful.

"Where patients are already cripples and a lifelong support is necessary, then doubtless the jacket gives the maximum of comfort; but in practice I have found, in every station of life, that where such support is requisite the patient after a time prefers an apparatus (felt or otherwise) that can be removed for toilet purposes to the plaster that is immovable and that has to be reapplied at stated intervals, even at a loss of some of the support that the bandage gives.

"*Re Scoliosis: (b) The Tripod Exercise.*—This can hardly be improved upon; and it remains the type of what technical calisthenics in these cases should be.

“ With due attention to the patient’s environment of place and habit, the muscles soon develop and harden under its proper use; and it brings the greatest number of trunk muscles into play at a given time, with a minimum of fatigue; in this surpassing other and more popular forms of exercise.

“ Even in confirmed scoliotic cripples, I have seen the daily expansion of the chest by the tripod exercise improve the heart’s action and materially aid in the restoration of the patient’s health, by mechanically permitting the better oxygenation of the blood and the freer action of the heart.

“ I consider it of more value than the plaster jacket in the Sayre method of treating scoliosis.

“ *Re Spondylitis: (a) The Plaster Jacket.*—In spondylitis the jacket fulfills all that its inventor claimed for it, allowing patients to be about and in the open air instead of being kept always on their backs; and they recover, *where the jacket is efficiently and sufficiently often applied*, with as slight deformity as though they had been kept lying down all the time.

“ I know of no disability attending the employment of it important enough to prevent its universal application; but at the same time, I have never known any treatment introduced into surgery that was less understood, or about which less trouble was taken to understand it practically.

“ While I still employ it in public practice, it is many years since I did so in private. The agitations of those who had ‘vested interests’ in spinal cases, and the prejudice of the public against an appliance that could not be removed for the bath, in a few years caused it to fall into disrepute, and save for hospital cases I do not think it is ever now employed.

“ The public refused to regard the benefit the jacket afforded as in any way weighing against any slight disagreeables it might possess; and an otherwise intelligent mother informed me once that she declined to go on with a treatment in which a surgeon’s personal attention was necessary at intervals of two or three months, when her instrument-maker could supply her with a steel and leather support that would last for years! And this may be taken as a fair sample of what many said or implied.

"When I add that leading instrument-makers advertised in the past that they put on 'Sayre's jackets' for the profession, and also that leading surgeons sent their cases to them for the purpose, and when I know of my own knowledge that the jackets were nothing but stiff plaster belly-bands, rapidly ex-coriating the flanks, and worse than useless, and their uselessness made known as demonstrative of the futility of 'Sayrism'—it is not surprising to find that the plaster jacket had to give way to steel, leather, and felt, which materials now reign supreme!

"However, the lesson taught by Sayrism has not been lost entirely; felt jackets, though an imperfect support, more nearly fulfill the principles of that system than the old steel and leather supports; and even those who still use the latter endeavor to get them more body-fitting than formerly.

"*Re Spondylitis: (b) The Tripod Exercise.*—I only use the tripod for the application of the jacket. In a stage when exercise might indeed somewhat unfold the spine by extension upon recently formed reparative material, I should consider its use as an exercise unwise; while where consolidation has occurred, it would be useless.

"The exception I make is in the case of deformity, after consolidation, being such in the dorsal region as to cause the chest to assume the position of deep expiration; then exercise, by acting through the thoraco humeral muscles, undoubtedly, as in old scoliotics, gives for the time free heart-play and better mechanical opportunity for the oxygenation of the blood, and thus the general condition of the patient is much improved."

Edmund Owen, London: "For a good many years I used suspension in the treatment of children with Pott's disease when applying plaster-of-Paris jackets; but, in due course, experience showed me that I got equally good results by applying the jackets as the child stood on the ground, the arms being held up out of the way. I am not a believer in extension of a carious spine. I found the plaster-of-Paris-jacket treatment cheap, handy, and efficient; but, as a kind Providence has removed me from further charge of out-patients, I no longer have occasion to apply the jackets personally. Still, I

have firm faith in them, and constantly get them applied by my house surgeons and dressers in Pott's disease.

"I consider their use in lateral curvature (curvature with rotation) to be injurious in childhood; though I freely admit that in the case of some limp and crumpled adults with lateral curvature, a gypsum corset may be applied with great advantage, especially if the patient be suspended during the application. Indeed, without suspension the jacket would be of little avail."

MacNaughton-Jones, London: "In reply to your letter I send you the photograph of the first patient on whom a plaster-of-Paris jacket was put in Ireland in the year 1876. It was adjusted by me prior to your visit to Cork that same year. Since that date to the present I have practiced the treatment there advocated by you, so far as suspension and support are concerned. Necessarily of late years my work has not carried me so much into this field of surgery as it did in Ireland. As you know, I published the results of my cases up to a certain date in the *Dublin Monthly Journal of Medical Science*. You want to know what is my present view of the results of your plan of treatment in spondylitis and scoliosis.

"*First, Spondylitis.*—I regard the *plaster jacket well* adjusted in the early stages of the disease as the most valuable support to the diseased structures I know of (I include in this statement all the hybrid deviations which imitators of your method have adopted), so long as the integrity of the support is secured and maintained. This, so far as I can judge, is essential. The head support I also include in this view. The treatment in the early stages should be, I hold, combined with a fair amount of rest in the horizontal position and all the other hygienic and locomotive aids which are so essential in this treatment.

"Given a fair case and prudent supervision with judicious change of the support, it is the treatment which I should adopt in the case of a child of mine affected with the disease. Certain cases of spondylitis, in which general tubercular affections of the various bones are present, can be *cured* by no treatment I know of. Deformity is inevitable, do what we will. I do

not suspend in Pott's disease save in placing the jacket on the patient. This latter is no hindrance to treating the complications of the disease. This I have proved many times. In the latter stages, when the support has done its work, I resort to the well-fitting poroplastic jacket with steel stays and the softened portion for the affected area. This I can combine with light arm supports and the head rest if necessary. This is my view of the plan you advocated, and which has stood (though so often twisted and turned for some faddist's personal advertisement as hardly to be recognized as yours) the test of the last twenty years. If the principle has failed, it has been from trial when no cure was possible, in cases in which nothing was to be expected from any plan of treatment, or it has been carried out ineffectually and imperfectly.

"*Scoliosis*.—I can not speak too warmly of my experience of the suspension treatment in scoliosis. I may have departed in a degree from my original practice in *always* employing the plaster jacket, perchance unwisely in some instances. I now rarely, in the cases that I am consulted in, use plaster. I use the poroplastic felt, carefully molded and applied under suspension, in all cases. I support the jacket with stays of steel where required, and combine at times light axilla props. I invariably insist on the practice of suspension by the neck at home, and combine the treatment with gymnastic exercises and the usual rules of hygiene and diet followed in such cases. I can unhesitatingly say that such treatment gives but the best results. I have never, since I put on the jacket I send you the photograph of, resorted to any other mode of treatment in any form of lateral curvature. I believe it to be the best. As a general rule, it has given me such good results that I have never been tempted to go outside it. Even in old and irremediable cases it has given the greatest comfort and *relief* from pain.

"In conclusion, let me, as one who has on many an occasion reaped the benefit of your inventive skill and sound practical teaching in this branch of orthopædic surgery, as *in many others*, pay no mere flattering tribute to the system of treatment you so graphically introduced into this country. But the real

testimony to its worth is one you may neither see nor hear. It is the unrecorded and unspoken gratitude of the many whose lives have been spared, whose sufferings have been mitigated, and deformities removed through your own work, and not of those who have followed in your footsteps. This is true of the past, it is equally so of the present, and it is my belief it will be so in the future."

E. Luke Freer, Birmingham: "My experience with plaster of Paris jackets dates from Dr. Sayre's demonstration in Birmingham some fifteen years ago, one of the patients being supplied by me from the Birmingham Royal Orthopædic Hospital, where I then held the post of honorary assistant surgeon. In that capacity I applied *every* plaster jacket for my senior colleagues (in those days everything 'spinal' was turtle-shelled indiscriminately), and I might almost have been dubbed 'honorary plasterer' to the hospital. As might have been expected, the results were not universally satisfactory. As honorary surgeon, I have dealt only with my own cases, but my applications have numbered over three thousand altogether, and I am now as firmly convinced as ever of the superiority of the plaster cuirass over all other methods for the treatment of spondylitis; where recumbency was necessary in cases of abscess, etc., I have found Thomas's double hip splint very serviceable. In high dorsal and cervical caries I have preferred Furneaux Jordan's modification, and in some cases Thomas's collar, to the jury-mast, as giving more complete fixation. In scoliosis (unassociated with spondylitis) I still use the cuirass, but only when the patient has to pursue his or her ordinary vocations, or at the commencement of treatment, until the muscles and muscular sense have been sufficiently re-educated and strengthened by systematic and harmonious kinetics and the correction of faulty positions, never when reclining or performing the exercises. I consider the constant use of the cuirass prejudicial in these cases, and I always use the divided cuirass with elastic lacing in scoliosis. I am convinced that the opposition to the cuirass has been mainly due to improper application, and the omission of the long 'reflected' vest which meets all objections on the score of 'chipping.' Elaborate instruments with ratchets and

pads I consider are worse than useless—the tortures of the Spanish Inquisition would seem to be the models on which some of them were fashioned.

“If I may be allowed to speak freely, I think that much of the present antagonism to the cuirass is due to the fact that Professor Sayre, in his excellent and explicit monograph, was rather too sanguine in stating that *any* practitioner could apply it. Many of the so-called plaster jackets I have seen were simply burlesques of the principles involved, and in this country the application has most frequently been relegated to nurses. I know of no operation, however, that depends more on strict attention to minor details for success, which details are only to be learned by experience. Poroplastic I have entirely discarded, as it is impossible to get it perfectly and accurately molded to the body, even where the deviation from the normal is slight. Again, it has nothing to recommend it even on the scores of expense or weight. Several of my cases have worn the divided plaster cuirass for more than twelve months with perfect comfort, the weight being no more than poroplastic. I continue to use partial suspension also in addition to other kinetics, especially in high dorsal curves and torticollis, with the best results.”

W. Bayard, St. John, N. B.: “It affords me much pleasure to say to you, and I do so in all sincerity, that I consider your ‘plaster jacket’ a boon to the profession and to the unfortunate sufferer with spondylitis. I have used it largely for many years—indeed, I use none other—and I can point with pride to individuals walking our streets who, but for Sayre’s jacket, would in all probability be in their graves. I have added various materials to the plaster with the view of rendering it less brittle, but I have found its porosity injured, so that I now use nothing but the plaster.

“In some instances I have inserted strips of steel, such as are used in ladies’ corsets, between the bandages with benefit. When applying the bandage I always allow the patient’s feet to touch the floor, and if he complains of pain in his legs I cease suspending, and I open the jacket for ablation purposes.

"I prefer the plaster jacket for scoliosis to any mechanical application I have seen, but I never trust to it alone, recommending such muscular exercises as the particular case demands.

"I may mention a traumatic case where the jacket answered admirably. A man was sitting under a heavy wheel when the supports broke; the wheel caught him on the shoulders, doubling him forward. I saw him immediately after the accident; he had no power in his legs, but yelled with the pain in them. I had him placed face down, with a man at each shoulder and at each foot, directed to make steady extension, while I made gentle pressure upon the prominence produced by the altered position of the vertebræ. In a moment or two the power of motion returned and the pain ceased. He was taken home on a door; the next day I placed your jacket on him, and kept him in bed ten weeks. He wore a jacket for two years, after which he was as strong as ever."

J. Nicolaysen, Christiania, Norway: "I have used your treatment of spondylitis and scoliosis by partial suspension and retention by plaster-of-Paris bandages since the time you first brought it forward for the public.

"I have always been very content with the results of this treatment; the results have naturally been more or less perfect after the condition of the patients, especially after the stadium of the diseases, when the treatment could be instituted; but always the condition has been bettered, in most cases for the life; I know not of any better treatment."

Enrique M. Porto, Havana: "... In conclusion: In angular curvatures of the spine the Paris-plaster bandage is the only and exclusively local treatment, and in light lateral curvature partial suspension and exercise combined is a good treatment, but I find it better if aided by retention of body by plaster-of-Paris bandage."

CORK, IRELAND, *November 30, 1894.*

Since 1877 I have treated most of my cases of spondylitis by means of the plaster-of-Paris jacket, using very slight extension, always taking care not to break up or injure any bony adhesion of the spinal column.

The great majority of patients treated in this manner did well. When this treatment failed, rest on a couch, together with some form of extension, was adopted, and after a time the plaster-of-Paris jacket was reapplied.

With regard to scoliosis, I have had the great privilege of seeing many cases treated by Professor Sayre himself. I have adopted and highly approve of his method of treatment by extension, using the exercises recommended by Dr. Reginald Sayre, and the cuirass as a support during the day in severe cases. But I have substituted the felt poroplastic jacket for the plaster cuirass, because I found that, owing to the extreme dampness of our climate, I was not as successful with my plaster-of-Paris work as Dr. Sayre had been with his.

NICHOLAS GRATTAN.

H. Hingston, Montreal, Canada: "In those cases of curvature arising from disease when uniform and comfort-giving support is of advantage, no surgical appliance, however well fashioned it may have been, gives me anything like the satisfaction I have had in the use of the simple and inexpensive support Dr. Lewis A. Sayre has given to the profession."

PITTSBURGH, PA., *December 31, 1894.*

Dr. Lewis A. Sayre, New York:

DEAR DOCTOR: I find that I will be unable to have the paper, now in preparation, upon Spondylitis and Scoliosis, completed in time to send you an advance copy, as per promise. It will not likely, however, contain anything that would be of particular value to you in the preparation of your paper. My treatment for the cases is based upon the plan as carried out by yourself and others. I use suspension, gymnastics, forcible correction, and retention by plaster-of-Paris bandages.

Shall look forward with a great deal of interest for the appearance of your paper, which I know will be of great value to us. Yours truly, S. L. McCURDY.

Dr. Redard, Paris: "In answer to the questions which you have been kind enough to ask me, I would say, I am a convinced partisan, first, of suspension and plaster jackets in the

treatment of scoliosis; second, of plaster jackets in the treatment of Pott's disease at a certain stage.

"In the *treatment of scoliosis* I recommend *vertical suspension* in cases of slight rigidity of the spinal column, and daily exercises as a preparation for the application of plaster jackets.

"Vertical suspension is the basis of a great number of exercises carried out with the different apparatus which are described in my work on *Orthopædic Surgery*.

"In a great number of cases where there is pronounced rigidity of the spinal column, I use my apparatus for lateral suspension.

The removable corset gives excellent results in a great number of cases of scoliosis which, in my opinion, however, are not obtained *solely* by its use, but in conjunction with proper exercises to strengthen the vertical muscles and restore the flexibility and proper position of the spinal column.

"It is of particular value where the spine is movable and not rigid, and where suspension corrects the deformity to a great extent; in these cases the faulty attitude is partially overcome, the lateral curve is very much modified, and the height of the patient is increased. In the interval between the exercises the patient is well supported, the pressure on the various points of the thorax forces him to take a correct position, and he does not lose the benefit gained by the various exercises used to correct the deformity.

"To sum up, the plaster corset is of particular value as a means of support after the rigid spinal column has been rendered flexible by the methodical use of exercises properly carried out.

"Experience has taught me that it exercises very little influence on the deformity of the ribs, or the twisting of the spinal column.

"I would further say I do not use plaster corsets in the early stages of scoliosis. I recommend it in cases where there is a lateral flexion and where the vertical curve has been partially overcome by the use of vertical suspension. I have obtained excellent results in some cases of scoliosis in its second stage, by combining the treatment of plaster jackets and exer-

cises with mechanical force in straightening the spinal column. The plaster jacket has been particularly valuable in my hospital practice, in very marked cases of scoliosis accompanied by pain and disturbances both of circulation and respiration. In these cases it has been of great benefit by supporting the body, preventing injurious compression of the organs of the thorax and abdomen, and greatly diminishing the pain.

"In the treatment of Pott's disease, when the disease is in the cervical region or accompanied by paraplegia, I employ *suspension*, placing the patient in an oblique or vertical position on a padded board.

"In the first stage of Pott's disease I prefer absolute rest in the horizontal position. I have obtained excellent results from the application of the plaster jacket at the period of reparation and consolidation of the spinal column, when it has been possible to prevent deformity and often pain has entirely disappeared, the result of entire rest in the horizontal position.

"According to my experience in some exceptional cases, the plaster jacket prevents, to some extent, the deformity in Pott's disease.

"I do not agree with some authors that this jacket can give extension to the two segments of the spinal column, and reduce pronounced curvature. The principal function of the apparatus is to obtain absolute rest and immobility for the diseased parts, and thus arrest the progress of the disease.

"In cases of Pott's disease in the cervical region the plaster jacket is of little use."

From this number of letters which, I take it, expresses pretty fairly the general opinion of the medical profession, I find six who condemn the plan altogether, or, at any rate, say that they do not use it; seven who say that in certain cases it is of use, and in others less serviceable in their hands than different means, and thirty-five who employ this mode of treatment altogether. Among the objections to their use, which have been set forth in the letters I have received, are those of Noble Smith, who says that "plaster-

of-Paris jackets ought to be utterly condemned—first, because of their great weight ; second, their interference with free respiration and cleanliness ; and, third, the fact that they act simply as heavy, unscientific corsets, pressing upon the chest, and add very little to support the spine.” I may simply answer these objections by saying that a properly made plaster jacket is but slightly heavier than a steel support, and in many instances is even lighter ; that, when properly applied, embarrassment of respiration is caused by the pain which free respiratory movements give the spine in Pott’s disease, and not on account of constriction of the plaster jacket ; and that, as far as cleanliness goes, the patients who are clean before the application of the jacket, and are properly attended to by careful parents or nurses, remain clean, and that the accumulated evidence of many prominent physicians is a better refutation than anything I personally can say of the charge that they are “ heavy, unscientific corsets, pressing upon the chest, and adding very little to support the spine.”

Of the various substitutes that have been used instead of plaster of Paris, silicate of sodium can be as accurately fitted ; but it is so much longer in setting that it is extremely difficult to make a good-fitting jacket on the patient, unless a plaster shell is placed outside of it to retain it in position until the silicate of sodium has become hard, or else the silicate jacket is made over a model, which adds greatly to the trouble of making the jacket. It also has the disadvantage of not allowing the insensible perspiration to pass through it, as does the plaster of Paris. This is apparent from the illustration of these two models, which represent two plaster jackets, covered in, top and bottom, with a small hole in one end to allow of the insertion of the stem of a tobacco pipe. One has been varnished and the other has not. Through the unvarnished one you see

the smoke passes freely when I blow it inside the jacket ; the other is impervious. In regard to felt, paper, wood, aluminum, leather, and celluloid, I would say that the felt, to my mind, is decidedly inferior to the plaster of Paris, being very little lighter, and in hot weather much more offensive. The objection to leather is that it is more liable to warp, and also the fact that it becomes offensive in hot weather. The celluloid, wood, paper, and aluminum jackets are lighter than the plaster of Paris, but have this disadvantage, that they require the services of a skilled artisan to construct them, and that they are beyond the reach of people of small means, who live at a distance from large towns, and a practical experience with them, as worn by different patients and manufactured by different surgeons, has shown me that they are much more difficult to adjust, so as to give comfort to the patient equal to that afforded by the plaster jacket. The principle, however, is that for which I strive—namely, the adapting of some plastic material to the body in cases of Pott's disease, in a position of comfort, and in lateral curvature in the position of best possible form, for the purpose of retaining the body continually in these improved positions—and the material of which the jacket is constructed is not essential, so long as the principle is carried out, though I think, in the vast majority of cases, that plaster of Paris will be found greatly superior to the other materials that I have mentioned on account of its cheapness and ease of application.

APPENDIX.

BERLIN, *December 23, 1894.*

DEAR DR. SAYRE: Owing to an unaccountable error I was under the impression that you would not deliver your address before January 15th, and therefore I had hoped to employ some leisure time at Christmas in fulfilling your request. To my great dismay, I see that the date is January 3d, not 15th, and that it is scarcely possible now for my answer to reach you in time.

I should feel inconsolable for this mistake were it not for the conviction that I can give you no information of importance, so that for you it is a matter of comparative indifference whether you receive my answer before or after your address.

From your great good nature I will trust that you will pardon me and not judge me too harshly.

With this letter I venture to send you a short article published in 1880, not because I think that it possesses any value, because your adjustable jackets are much simpler and more practical, but I wish to show you that I have always felt a keen interest in your method of treatment, which I consider a great advance on previous methods.

That I have, however, used portable plaster jackets only in a few cases during the last ten to twelve years is owing principally to reasons which in themselves have but slight connection with your method.

These reasons I will endeavor to give you briefly.

There is no necessity for me to enlarge at present upon the advantages of your beautiful plaster jackets, which are as familiar to yourself as to me. They are readily applied, are light, porous, cheap, obtainable anywhere, and—a fact upon which I lay as much stress as you do—they enable the physician to treat the case personally from beginning to end.

My reasons for adopting other styles of jackets in spite of all this are as follows:

In spite of all my efforts I could not succeed in giving the

plaster jackets that durability which many of my patients required. A large proportion of my patients I see but once a year, some of them but once in two or three years, or not even so often as this, as they do not live in Berlin, and not a few—especially the older ones—require that their jackets should last several years.

The plaster jackets, like all which are of unyielding material, do not allow of sufficient discrimination; in slight or severe scoliosis the same jacket is always employed. As I treat even the mild cases with jackets, as well as gymnastics and massage, and consider the use of the jacket as the most important part of the treatment, it becomes necessary for me to have jackets of varied construction to suit special cases. In slight scoliosis I use simpler forms, which are, of course, less constraining. In severe scoliosis and spondylitis I use more complicated forms.

Elderly people, especially women, feel very uncomfortable in the stiff jackets; they complain of pressure, impeded breathing, etc., inconveniences which can be avoided by the use of steel drill* jackets without losing the advantages of a sufficient support to the body.

Very young women often assert that the plaster jackets, and those of felt and wood, disfigure them more than the scoliosis itself, greatly increasing the size of the waist; further, they find them especially unpleasant in dancing. These disadvantages are not so manifest in the steel-drill jackets.

From my own observation I am of the opinion that the muscular tissue wastes away more quickly under the rigid material than under the steel-drill jackets.

Therefore I now use the plaster jackets only among the poorer classes, or in cases of spondylitis where a good support is required, until a suitable felt jacket can be provided.

In cases of severe scoliosis of little children, as also in spondylitis—in acute stages of the latter as a temporary means—I use felt-steel jackets made on a plaster model and working in exactly the same way as your plaster jackets. So soon as the pelvis is sufficiently developed to give a proper support, I prefer to use

* That is, cloth supported by steel bands.

in spondylitis the steel-drill jackets with hip attachments and firm arm supports.

Partial suspension I make use of in preparing the models for felt-steel corsets and also as a gymnastic exercise in the treatment of scoliosis. For the latter purpose it is widely used in Germany.

Begging once more that you will kindly pardon my neglect, and that you will remember me most cordially to Dr. Reginald Sayre, I remain with much esteem and best wishes for the new year,

Yours most truly,

FLOR. BEELY.

ODESSA, *December 23, 1894.*

DEAR SIR: In answer to your kind letter I communicate you what follows:

In the treatment of spondylitis and scoliosis I consider portable apparatus as a very important factor.

In the beginning of my six-years-long practice I used to employ with success in the polyclinical cases the immovable plaster-of-Paris corsets; in private practice, when the patient's means allowed it, I applied wooden stays. Lately, in the first above-mentioned case I continue to use the same corsets, while in the last I apply Hessing's stuff-stays.

I use the plaster-of-Paris stays in the following way:

Partial suspension after "Beely," with that difference, that at Beely's the patients touch earth only with the tiptoes, while I find it sufficient when they touch it swiftly with the whole sole. On the body of the patient, done over with vaseline or covered with thin jersey, I apply a slight layer of ordinary richly gypsumed bandages of starched stiff gauze (not above two millimetres). When, after one to two minutes, that layer is congealed, I do it over again on of stays, bandages (thick-starched stiff gauze, little gypsum). When the layer has attained the thickness of three to four millimetres and is hard, I take off the whole by making a slit in front and immediately take out from inside the first thin layer, which parts very easily, as it is separated from the plaster-of-Paris corset itself by a layer of vaseline.

The advantages of the method are:

1. The absence of folets on the inner part of the stays. 2. On the hardened surface the stays become firmer, thinner, neater.

After having been dried in the drying room, or in summer in the sun, such stays fit exactly the body, as they contract while dried.

The dry stays are covered inside and outside with jersey by means of starch gum, their edges finished with dogskin; the stay lace is sewed on, etc.

The technique of wooden stays is explained in the herewith joined article. The technique of Helsing's stays is described, as you know, in the *Lehrbuch der orthopäd. Chir.*, von Albert Hoffa.

In the present time I use the plaster-of-Paris stays only when Helsing's stays are inaccessible for the patient on account of their price. The fixation of Helsing's stays is the most perfect, as well in cases of spondylitis as in those of scoliosis. The wearing of stuff stays, bound with steel, is much more agreeable to the patient than that of any hard stays, even the most perfect.

Patients that have worn hard stays, even of the lightest kind—as those of felt, of wood, or of celluloid—when they get Helsing's stays, that weigh much more, assert them to be much lighter, because they lie softly on the body. I consider as the principal defect of all hard stays, not excepting the plaster-of-Paris corsets, that they do *not fit firmly in the waist*. That defect impedes, especially in the treatment of spondylitis of the higher pectoral vertebræ, when the jury-mast is added to the stays, for the fixation of any hard stays on the pelvis is precarious.

As the use of hard stays is inevitable, Helsing's stays being dear, I consider the plaster-of-Paris stays as the best on account of the following reasons:

1. They are cheap. 2. They are easily adapted directly on the patient without pattern. 3. They do not alter their shape and are not deflected by heat. 4. It is easy by means of a hammer to make a soft place in them. Their solidity, when well

executed, is quite sufficient for children, when stays have to be changed every four to five months. They are less convenient when there is no necessity for such frequent change.

Hoping, dear sir, to have answered in a satisfactory way to your kind inquiry,

Yours truly,

J. WALTUCH, M. D.

1532 PINE STREET, PHILADELPHIA, *February 14, 1895.*

Dr. Lewis A. Sayre:

DEAR DOCTOR: I may briefly add that my feeling with regard to the use of plaster-of-Paris bandages, in accordance with your suggestions in the treatment of spondylitis and scoliosis, is, that so far as spondylitis is concerned it affords the readiest and best mode of treatment that has ever been suggested for physicians residing at a distance from centers of population, who are unable to avail themselves of the aid of the instrument-maker.

With regard to scoliosis, I have not felt so well assured as to the expediency of using it. In the treatment of this latter affection it is necessary to continue our mechanical support for such a very long period, in order to obtain lasting results, that I have somewhat feared the effect of the necessary compression of the chest on the general development and nutrition of the patient. My theory in the treatment of the latter affection has been to make use of elastic force applied simply in the directions opposed to the deformity.

Looking at the entire question from a more general standpoint, I wish to say that nothing in the modern history of orthopaedics has done so much to bring about a revival of interest in this class of cases on the part of the general practitioner, or to conduce to a rational and effective management of spinal affections, not in this country alone, but throughout the world, as your able advocacy of the methods introduced by you.

Yours fraternally,

BENJAMIN LEE.

THE PLASTER OF PARIS, WOOD, ALUMINUM, AND OTHER SPINAL SUPPORTS.*

BY A. M. PHELPS, M. D.

I AM exceedingly obliged to Dr. Sayre for the courtesy which he has extended by asking me to discuss the paper of the evening. On nearly all of the points which have been raised in this paper I fully agree with him. And that the plaster-of-Paris corset is one of the best supports for Pott's disease of the spine ever devised my experience verifies. Without it it would be difficult for me to conduct the clinics and dispensaries of which I now have charge. While it has many defects and demerits, its good qualities will more than overbalance the bad, and because of this, and because its application is based upon accurate scientific principles, I give it a most hearty indorsement.

I have used the plaster-of-Paris corset from its very first inception. I have watched its growth from the time of its first application; I have seen it fail through bad materials and worse application; I have seen it bitterly fought against by its opponents, receiving just and unjust criticisms. I have watched its methods of application gradually reconstructed, the materials from which it is made improved,

* Prepared to be read before the New York Academy of Medicine, January 31, 1895, in the discussion of Dr. Sayre's paper published in the *Journal* for March 16th and 23d.

and I am free to say, after fourteen years of experience, that it is one of the best supports to be used in Pott's disease of the spine the world has ever seen. The arguments which have been urged against its use are most fallacious. That it does *not* support is argued by some of its bitter adversaries. But when in Pott's disease of the spine a patient is suspended and a jacket properly adjusted, he is at once relieved from a condition of pain and suffering, and to that extent that any amount of pressure upon the shoulders does not produce pain. I am convinced that something does support. If it is not the jacket, what is it? A patient with lateral curvature of the spine is suspended; a plaster corset with lacings is made to fit him in this suspended and straightened position. After the corset has been adjusted the patient is three inches taller than before its application. If the corset does not support, what makes him three inches taller? I have personally observed this change in many cases, and no amount of argument advanced by the opponents of the plaster-of-Paris corset can possibly disprove a clinical fact. One fact is worth more than a thousand theories. The first book written on steam navigation by an Englishman, in which he attempted to prove that a steamship could not cross the Atlantic Ocean, was a failure, because, after his book was printed, it was brought to this country by the first steamship. And so it is with this argument. The patient *is* three inches taller with the corset than he is without it. What makes him three inches taller? Support. It is true that this corset becomes filthy; vermin invade it; but it is inexpensive, and can be changed, if necessary, once a month. Much better this than the application of a steel brace that a mother or nurse can remove at liberty, handling the child in such a manner as to produce trauma and injury to the diseased vertebra. The steel braces must be frequently removed or else excoria-

tions will occur. They excoriate and are uncomfortable if they give support, which is one of the strongest arguments against their use in Pott's disease of the spine.

We are all agreed, I believe, that the best orthopædic machine ever devised is the human hand; guided by intelligence, it applies forces for the correction of deformity more delicately and perfectly than any inanimate object ever invented. Plaster of Paris is applied to the deformity. While in the plastic state the hands mold it to the corrected position, and hold it there until it is hard or set. Can you not see that now the plaster of Paris continues to do the work exactly as the human hand did it? In other words, plaster of Paris is effective as a brace or support only in proportion to the amount of gray cerebral matter concerned in its use. In the absence of the latter it is worthless. Proper materials must be used, else the plaster will not set rapidly. H. B. Claflin & Company make me a perfect hospital crinoline, No. 100, containing just the proper amount of sizing and no indigo. The White Dental Manufacturing Company, of New York, puts up the plaster in tin cans hot from the oven. These two materials make, when put together properly, a perfect bandage that will set in five minutes. This rapid setting of the plaster is necessary, because the hand holds it to the corrected position of the deformity. This material, with the stockinet sold by Ford, completes the materials necessary to make a perfect corset. The crinoline costs six cents a yard, the plaster of Paris three cents a pound, and the stockinet thirty cents a yard. A corset for a child six years old should weigh not to exceed one pound and a quarter, and for an adult two pounds and three quarters. This makes a support as light or lighter than the steel brace, and it supports as the steel brace can not.

What the profession wants is a proper brace—one that

will apply extension and relieve pressure, and also act as an antero-posterior support, transmitting the weight of the body through the transverse and articular processes, thereby relieving the bodies of the diseased vertebræ. Such a support is to be found in the plaster-of-Paris corset; it re-



FIG. 1.

moves from the nurse or the mother the possibility of interfering with the dressing. By its particularly broad, even surfaces, if properly applied, it does not excoriate, and can be worn for one or two years with comfort. Springing or bending the corset antero posteriorly makes it an antero-posterior support. Thus we see that it combines the good qualities of all the steel braces that have ever been devised, and one more, and that is *extension for the relief of pressure*. The corset is heavy when improperly made. It is not so porous as we

are led to believe. Its thickness makes it objectionable to women. This has led me to substitute for it the wooden corset (Fig. 1); the paper corset, made from paper such as is used in making paper boats; and the alu-

minum corset (Fig. 2). These corsets combine all the good elements of the plaster-of-Paris corsets, and, in addition to these, lightness, durability, and thinness, which do not interfere with the clothing of women.

In clinical work and among the poor patients the plaster-of-Paris corset fills the gap that nothing else can possibly fill. These patients, supported by steel braces, I am informed, and I have observed, almost invariably go on from bad to worse as regards deformity; they certainly do in disease above the eighth dorsal vertebra. I feel satisfied that in this class of patients the steel braces will be utterly abandoned in the very near future; they certainly should be in lateral curvature of the spine in any case. Now, in private practice, I know of no better dressing for Pott's disease than a light and thin plaster corset during the acute stage, after that the corsets that I have al-

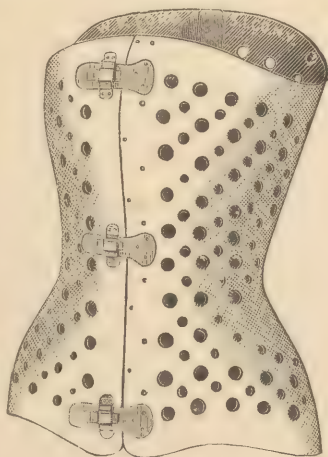


FIG. 2.

ready mentioned, the use of which will be found to be more comfortable and agreeable to the patients. The difficulty with leather corsets is that they fail to support, because they do not retain their shape; as a boot changes on one's foot, so will a leather corset change upon the body. The spinal support for Pott's disease of the spine must be unyielding and firm. The paper corset first made by Vance is, in some respects, a good corset; but it is not

desirable; it is difficult to make, and it is somewhat expensive. Since the time of Vance other paper corsets have been made according to different formulæ; but they are made of paper and are really only modifications of Vance's idea. The corset made by Weigel, of Rochester, N. Y., from the paper pulp used by printers in making their matrices, he alleges, is durable and comfortable. The corsets made for me by Horace Waters & Co., of Troy, N. Y., after the paper-boat formula, have proved most satisfactory; but it is more bother to get them than I care to endure. Other corsets made in this city, similar to that made by Vance, are open to the same criticisms as those mentioned. The jury mast and corset, when adjusted so as not to lift the head, but to draw it backward so as to transmit the weight of the head through the transverse and articular processes, makes the most efficient dressing that I know anything of, and particularly in upper dorsal and cervical disease. So far as I have observed, the deformity does not increase, as is the case with a steel apparatus in diseases of the upper dorsal region.

Professor Sayre has accomplished much by his constant and indefatigable hammering at the profession toward introducing the idea of partial suspension and fixation in Pott's disease of the spine; but the idea of partial suspension and fixation in Pott's disease of the spine carries us back almost to the traditions of medicine. Ambroise Paré, in 1579, used a fixation apparatus made from steel which is almost identical with the aluminum corset which I am using.

In 1696 von Nuck made a suspension apparatus which has been in almost constant use in Europe since that time. It is very similar to that used to-day bearing the name of the distinguished author of the paper of the evening. In 1700 Heister devised an antero-posterior support which in

principle is the same as Taylor's brace used to-day. It has been in use in England since that date. In 1754 Hauer mann made a modification of von Nuck's suspension apparatus, which seems, however, to be more a change of material than principle. In 1764 Levacher devised the jury mast, which was attached to a corset made of steel and canvas, and was used precisely as the jury mast is used to-day. Portal, in 1772, slightly modified the jury mast, but attached it to a corset in the same manner. In 1825 De La Croix still further modified it by adding the chin piece. Heine, in 1832, still further modified Levacher's jury mast by adding a chin piece and attaching it to a steel hip-band corset. These jury-mast suspensions, taken together with the description of their use, are identical with those in use at the present time. About the only thing that this generation can claim in regard to spinal supporting is in the change of materials, using the principles laid down in the last century and the beginning of the present. They have been in constant use since then, and also the principles, as exemplified here to-night. I believe them to be correct. The profession owes a debt of gratitude to the author of the paper for having forced upon the American profession the idea of partial suspension and fixation in the treatment of Pott's disease of the spine.

I offer the aluminum corset not as a substitute for many of the braces and corsets now worn in the acute forms of Pott's disease and lateral curvature; I suggest it, rather, to take the place of such braces in cases requiring permanent bracing, or in individuals who are desirous of securing a support at any time which combines durability with lightness and comfort. So soon as a case of lateral curvature has been arrested, or the greatest amount of benefit has been derived from treatment, the aluminum corset will then be found a most agreeable permanent support.

The aluminum corset has these qualities to recommend it to the patient :

1. Lightness.
2. Durability.
3. It is thin, and does not interfere with the form and clothing.
4. Being extensively perforated makes it the coolest and most agreeable of supports.
5. The patient can wear it during bathing.

An ordinary corset weighs from one to two pounds, depending upon the size. To prevent cracking and to protect it from perspiration, it is covered with a waterproof enamel which is applied by heat.

The steps of its construction : Make a plaster form of the body ; send this form to the foundry and have a cast-iron anvil made ; polish this, and then at a certain temperature the workmen will bend on to it two sheets of aluminum representing the two lateral halves. The frequent heating and hammering, together with the cylindrical shape, make the corset almost as strong as steel. The two halves are hinged in the back and closed with automatic clasps in front, which stop at any notch to accommodate itself to the body before and after eating. This corset completes my armamentarium in cases requiring spinal supports—viz. :

1. Plaster-of-Paris corsets for acute Pott's disease.
2. The wood corset for lateral curvature and cured or convalescent cases of Pott's disease.
3. The Beely corset for mild forms of lateral curvature, particularly in girls.
4. The aluminum corset for permanent bracing.
5. The celluloid corset which, in a way, takes the place of the aluminum.

I visited Dr. Waltuck, of Odessa, Russia, in 1888, and

from him personally I learned the details of making the wood corset (Fig. 1) after several days of hard work. I found that Professor Lorenze, of Vienna, had been using the corset for some time, and was much pleased with it. At that time, however, many of their corsets proved to be inefficient on account of errors in their construction. We have used the corset constantly since that time, and, with the modifications which we have made, it is one of the most efficient, comfortable, and suitable braces that I know of.

It has been with the greatest difficulty that we have succeeded in getting the proper materials for constructing the corset, and even now it is cheaper and better to import the wood from Vienna. The spruce timber which grows there makes a better shaving than any timber that we have attempted to use which grows in America. It is tougher and works better with the glue.

An impression is made of the body with plaster bandages. This mold is filled with plaster of Paris, which makes a perfect cast of the body. The corset is now made over this cast. The cast is changed somewhat in shape to make the form even straighter than the body in the suspended position.

Corsets made according to the method followed at the time I observed the process were not so perfect as they should be. The slightest excess of glue, moistened by the perspiration of the body coming in contact with the shirt or the skin, was exceedingly disagreeable. The perforations in this corset weakened it and allowed the glue to exude during perspiration.

To obviate all this I had the corset perforated, as seen in Fig. 1, in which perforations eyelets were punched. A special machine facilitates the perforating and the punching of the eyelets. The lacings are stitched on as in Fig.

1. Trim the top and bottom with kid. The entire corset is covered inside and outside with two or three coats of shellac, which render it impervious to moisture, the eyelet holes ventilating it perfectly. The improvements which I have made in the corset consist in coating it with shellac on the inside and outside and putting eyelets in the eyelet holes, which add to the strength of the corset and ventilate it perfectly.

An ordinary corset for an adult weighs from a pound to a pound and a half. They are very durable, very comfortable to wear, and thus far I believe they are the best spinal braces yet devised.

I will add, by way of parenthesis, that the corsets, when completed, can be covered with silk or with stockinet, or they can be left in the linen finish.

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EDITED BY

FRANK P. FOSTER, M.D.

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